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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,147	01/25/2007	Tomoyasu Sunaga	17155/005001	6796
22511 7590 07/22/2010 OSHA LIANG L.L.P. TWO HOUSTON CENTER 909 FANNIN, SUITE 3500 HOUSTON, TX 77010				
EXAMINER BOHATY, ANDREW K				
ART UNIT		PAPER NUMBER		
1786				
NOTIFICATION DATE		DELIVERY MODE		
07/22/2010		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@oshaliang.com  
buta@oshaliang.com

### Office Action Summary

**Application No.**

10/589,147

**Applicant(s)**

SUNAGA ET AL.

**Examiner**

Andrew K. Bohaty

**Art Unit**

1786

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 May 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3,5-7 and 9-16 is/are pending in the application.
- 4a) Of the above claim(s) 13-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7 and 9-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This Office action is in response to the amendment filed May 28, 2010, which amends claims 1 and 5 and adds claims 9-16. Claims 1-3, 5-7, and 9-16 are pending.
2. Newly submitted claims 13-16 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: newly submitted claims 13-16 are directed to the method of making the light emitting polymer, which is an independent invention from the originally claimed invention which only claimed the light emitting polymer and an electroluminescent device comprising the light emitting polymer. In the instant case the product can be made using a different method, such as dialysis and precipitation of the polymer from solution.
3. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 13-16 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Response to Arguments***

4. Applicant's arguments filed May 28, 2010 have been fully considered but they are not persuasive.
5. In response to the applicant's arguments that the lower the concentration of the impurities the better the performance of the polymers is not true, when one looks at Tables 1, 2, and 3 in the applicant's specification, it is clearly seen that when each type

of impurity is at its lowest amount the maximum current efficiency is at the highest value. This corresponds to sample 1 in Table 1, sample 7 in Table 2, and sample 13 in Table 3. These results show that compounds that have the lowest amount of impurities have the greatest current efficiency. In contrast the applicant's arguments. Furthermore, when comparing samples 4 and 6 in Table 1, the difference in current efficiency is very small and the error and the significance difference is not given; therefore, one cannot know the true meaning of the values. Also, all the amounts of the impurities changes; therefore, one cannot determine the effect each type of impurity is having. Regarding samples 10 and 12 in Table 3, these values appear to be at the lower limit of the detection method used; therefore, the current efficiency for these samples could be different. These values appear to be small and the error of the measurement is not given; therefore, it is unclear how to values relate to one another. Further, the amount of more than one of the impurities changes values and the change in value of the impurities for 16 to 18 is not just an increase or decrease, but both the impurities are both increasing and decreasing; therefore, one cannot determine what effect each impurity type is having. Regarding samples 16 and 18 in Table 3, the samples do not have the same current efficiency, sample 16 (the sample with the lowest impurity amount) has a greater current efficiency (0.22 cd/A for sample 16 and 0.10 cd/A for sample 18).

### ***Claim Objections***

6. Claims 10 and 12 are objected to because of the following informalities:

7. The term **poly(9,9-dioctyl)fluorine** should be corrected to **poly(9,9-dioctylfluorene**.
8. The term **poly(9,9-diethylhexyl)fluorence** should be correct to **poly(9,9-diethylhexyl)fluorene**.
9. Both claims 10 and 12 repeat the term poly(9,9-diethylhexyl)fluorence, one of the repeated terms should be deleted.
10. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

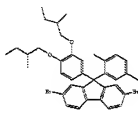
12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claims 1-3, 5-7, 9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aurelie et al. (WO03/048225), where Treacher et al. (US 2004/0260090) (hereafter "Treacher") is used as the English equivalent, in view of Son

et al. (US 2003/0094595) (hereafter "Son") and applicants' admitted prior art (hereafter "AAPA").

14. Regarding claims 1-3 and 5-7, Treacher teaches polymers comprising the



following monomer unit, , and teaches the polymer is used as a light emitting material in an electroluminescent device (Table 1, paragraphs [0108] and [0135]). Treacher further teaches that the amount of impurities, including inorganic substances, including metals such as Pd, found in the polymers should be as possible and the impurities can be removed by a variety of different means (paragraph [0090]). Treacher teaches that impurities, such as Pd, cause impairments in the light emitting device and the impurities should be removed (paragraph [0068]).

15. Treacher does not specifically teach the amount of the impurities in the polymer and is silent in the presence of Cl.

16. Son teaches fluorene containing polymers that can be used in the light emitting layer of a light emitting device (Fig. 1 and 2 and paragraphs [0080] and [0081]). Son further teaches the polymer contains impurities and the impurities need to be removed from the polymer (indicating the polymer should contain as little as the impurities as possible) (paragraph [0009]). Son teaches that removing the impurities improves the performance of the light emitting device (paragraph [0009]). Son is silent on the types of impurities.

17. AAPA teaches that polyfluorenes contain impurities and these impurities includes inorganic impurities such as metal elements including sodium, nickel, and palladium and other inorganic impurities such as chlorine (page 2 second to last paragraph of the specification). AAPA further teaches that these impurities reduce the performance properties of the light emitting device they are used in (page 2 last paragraph of the specification).

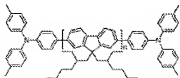
18. Given the teaching of Treacher, Higashi, and AAPA, it would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the impurities from the fluorene containing polymers, to where the sum of the metals is less than the amount of chlorine. It would be obvious to reduce the amount of chlorine to be 50 ppm or lower. The motivation would have been to increase the performance properties of the light emitting device.

19. Furthermore, Treacher, Son, and AAPA teach that metal impurities, such as Pd, and halogens, such as Cl, are not good for organic light emitting materials when found in these materials as materials and the amount of these materials should be reduced as much as possible. It is well know that both the metal and Cl components are bad and there is legal precedent, that purer forms of known products may be patentable, but the mere purity of a product, by itself, does not render the product unobvious, *Ex parte Gray*, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). Since the applicants do not provide any secondary evidence of unexpected results for the purified polymer and claim a purer form of a known product, the claims are not unobvious over the prior art and are not patentable.

20. Regarding claim 9 and 11, these claims are product-by-process claims; therefore, the patentability of the claims is determined by the product and not the process. Since Treacher in view of Higashi and AAPA teaches that the amount of impurities needs to be as low as possible that the impurities can be metal ions and chloride ions the process to remove the impurities does not matter as long as the processes taught by Treacher in view of Higashi and AAPA can be used to meet the claimed process.

21. Claims 1-3, 5-7, and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miteva et al. (Adv. Mater. 2001, 13, 565-570) (hereafter "Miteva") in view Aurelie et al. (WO03/048225), where Treacher et al. (US 2004/0260090) (hereafter "Treacher") is used as the English equivalent, Son et al. (US 2003/0094595) (hereafter "Son") and applicants' admitted prior art (hereafter "AAPA").

22. Regarding claims 1-3, 5-7, 10 and, 12, Miteva teaches an electroluminescent device comprising an anode, a cathode, and a light emitting layer composed of a fluorene polymer containing end-caps (page 567 left column last paragraph, right column first paragraph and page 569 right column 4<sup>th</sup> paragraph). The polymer has the

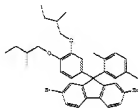


following structure, (page 566, Fig. 1, Table 1).

23. Miteva does not teach the purification of the fluorene polymers.



24. Treacher teaches polymers comprising the following monomer unit,



, and teaches the polymer is used as a light emitting material in an electroluminescent device (Table 1, paragraphs [0108] and [0135]). Treacher further teaches that the amount of impurities, including inorganic substances, including metals such as Pd, found in the polymers should be as possible and the impurities can be removed by a variety of different means (paragraph [0090]). Treacher teaches that impurities, such as Pd, cause impairments in the light emitting device and the impurities should be removed (paragraph [0068]).

25. Son teaches fluorene containing polymers that can be used in the light emitting layer of a light emitting device (Fig. 1 and 2 and paragraphs [0080] and [0081]). Son further teaches the polymer contains impurities and the impurities need to be removed from the polymer (indicating the polymer should contain as little as the impurities as possible) (paragraph [0009]). Son teaches that removing the impurities improves the performance of the light emitting device (paragraph [0009]). Son is silent on the types of impurities.

26. AAPA teaches that polyfluorenes contain impurities and these impurities includes inorganic impurities such as metal elements including sodium, nickel, and palladium and other inorganic impurities such as chlorine (page 2 second to last paragraph of the specification). AAPA further teaches that these impurities reduce the performance

properties of the light emitting device they are used in (page 2 last paragraph of the specification).

27. Given the teaching of Treacher, Higashi, and AAPA, it would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the impurities from the fluorene containing polymers of Miteva, to where the sum of the metals is less than the amount of chlorine. It would be obvious to reduce the amount of chlorine to be 50 ppm or lower. The motivation would have been to increase the performance properties of the light emitting device.

28. Furthermore, Treacher, Son, and AAPA teach that metal impurities, such as Pd, and halogens, such as Cl, are not good for organic light emitting materials when found in these materials as materials and the amount of these materials should be reduced as much as possible. It is well known that both the metal and Cl components are bad and there is legal precedent, that purer forms of known products may be patentable, but the mere purity of a product, by itself, does not render the product unobvious, *Ex parte Gray*, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). Since the applicants do not provide any secondary evidence of unexpected results for the purified polymer and claim a purer form of a known product, the claims are not unobvious over the prior art and are not patentable.

29. Regarding claim 9 and 11, these claims are product-by-process claims; therefore, the patentability of the claims is determined by the product and not the process. Since Miteva in view of Treacher, Higashi, and AAPA teaches that the amount of impurities needs to be as low as possible that the impurities can be metal ions and

chloride ions the process to remove the impurities does not matter as long as the processes taught by Miteva in view of Treacher, Higashi, and AAPA can be used to meet the claimed process.

### ***Conclusion***

30. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

31. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew K. Bohaty whose telephone number is (571)270-1148. The examiner can normally be reached on Monday through Thursday 7:30 am to 5:00 pm EST and every other Friday from 7:30 am to 4 pm EST.

33. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on (571)272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

34. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. K. B./  
Andrew K. Bohaty  
Patent Examiner, Art Unit 1786

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1786